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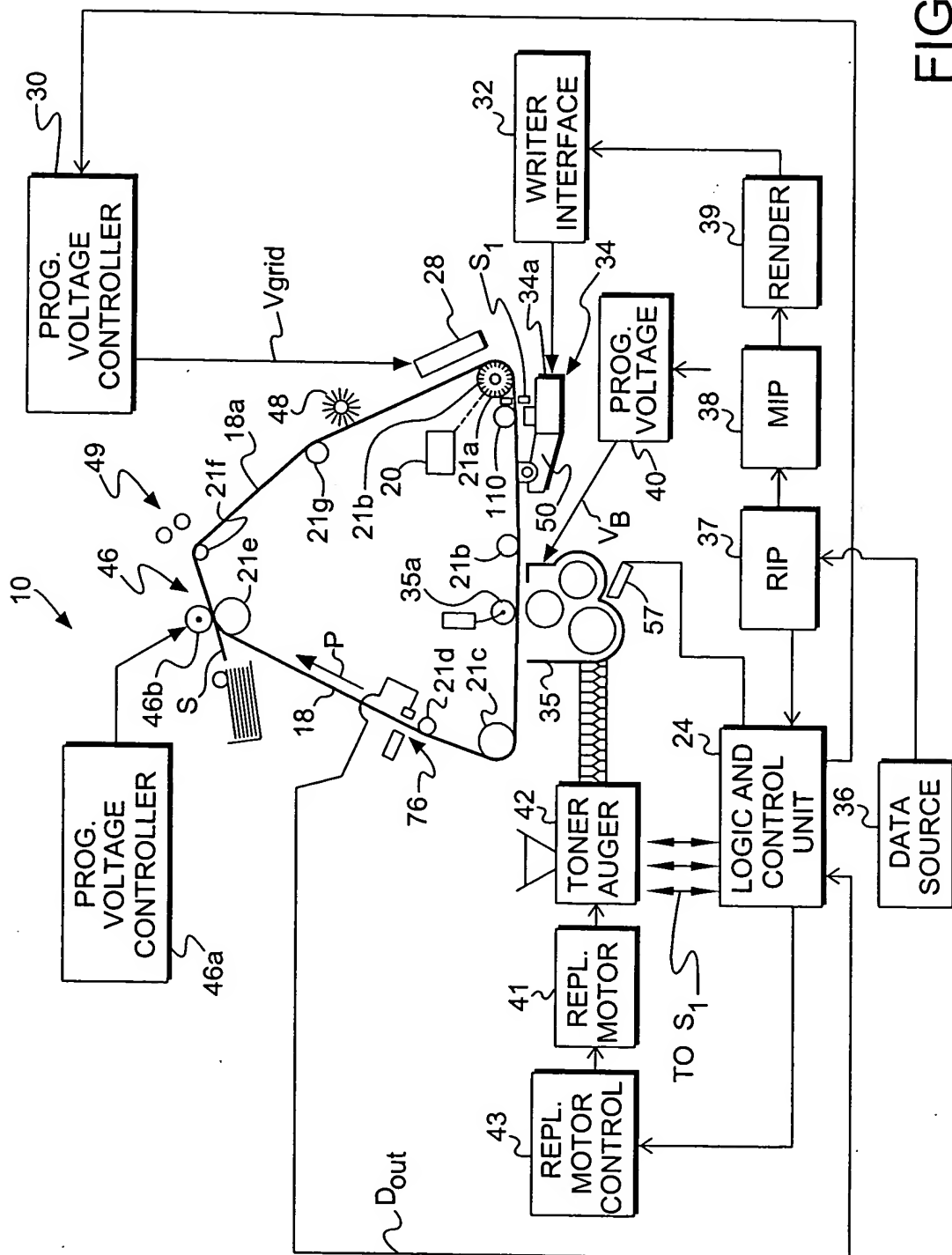


FIG. 1a

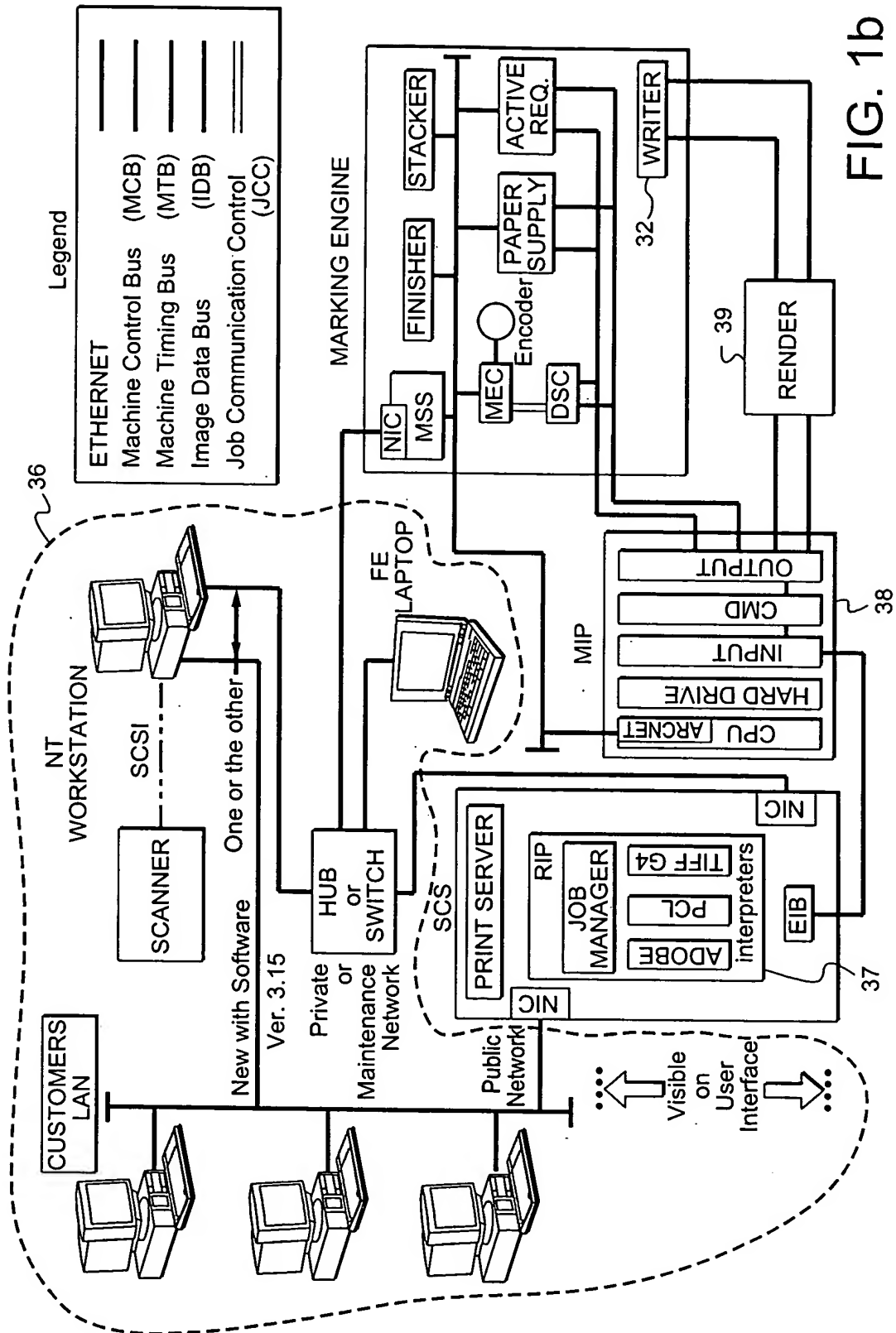
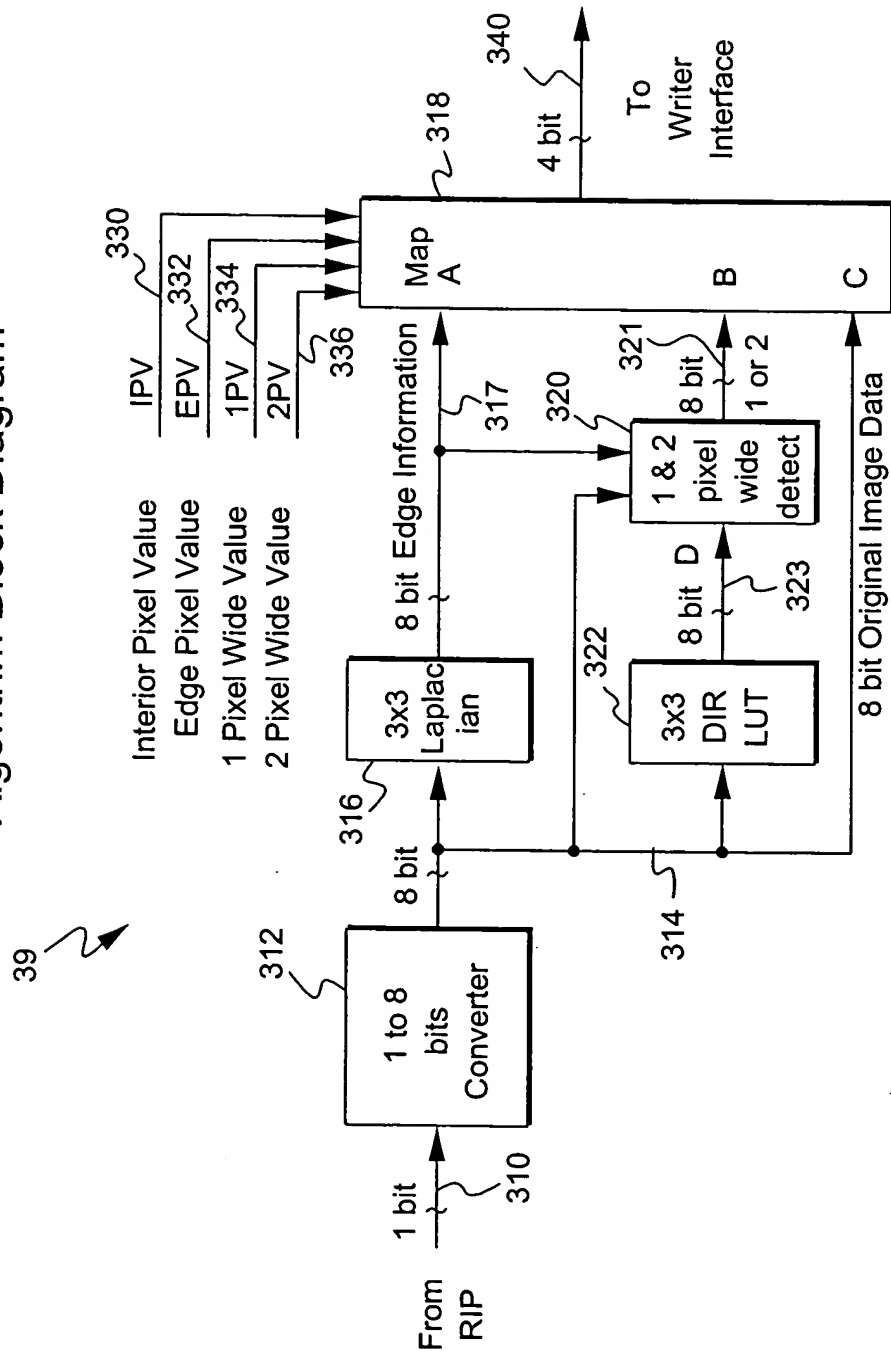


FIG. 1b

## Algorithm Block Diagram



**FIG. 2**

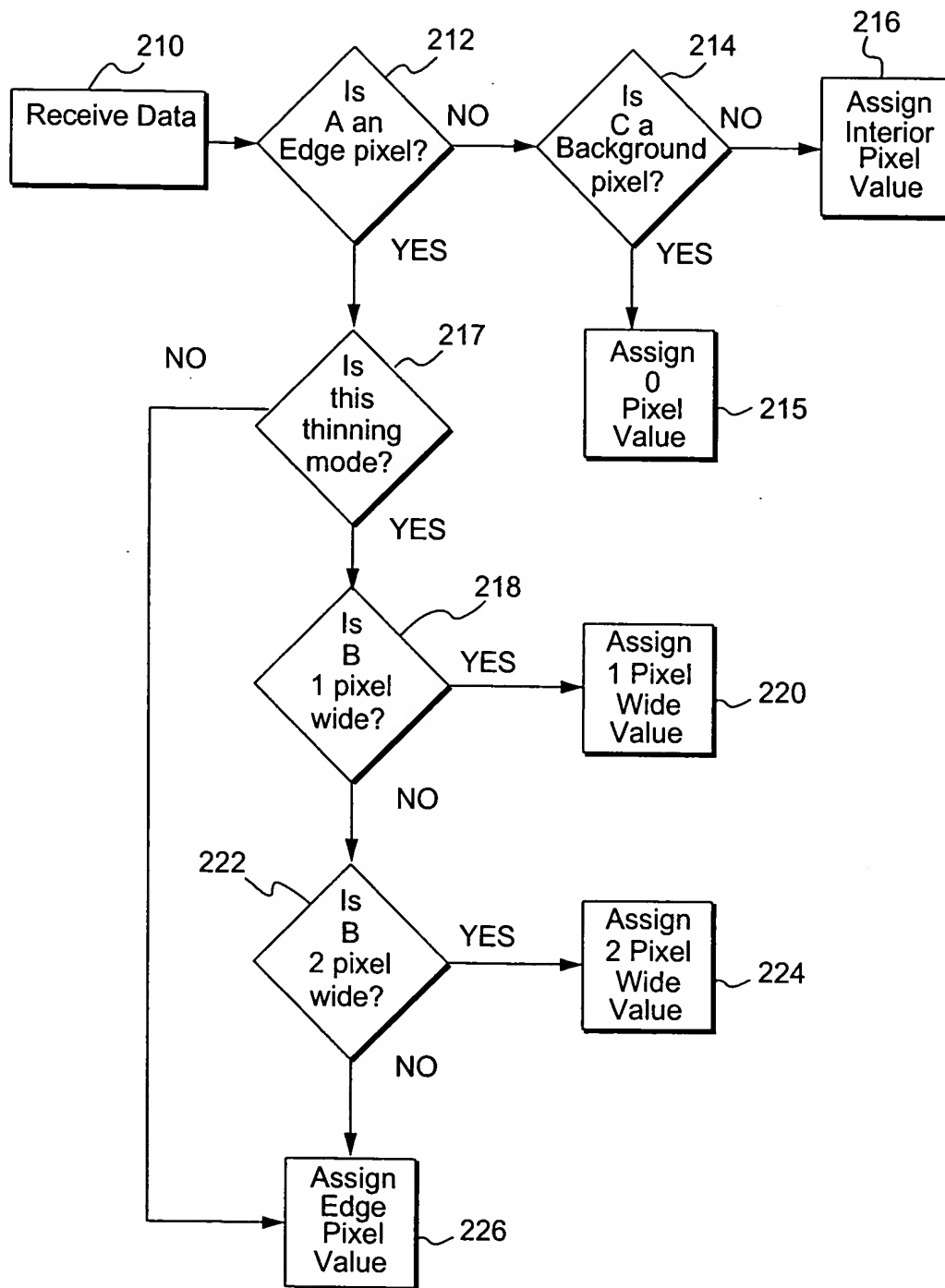
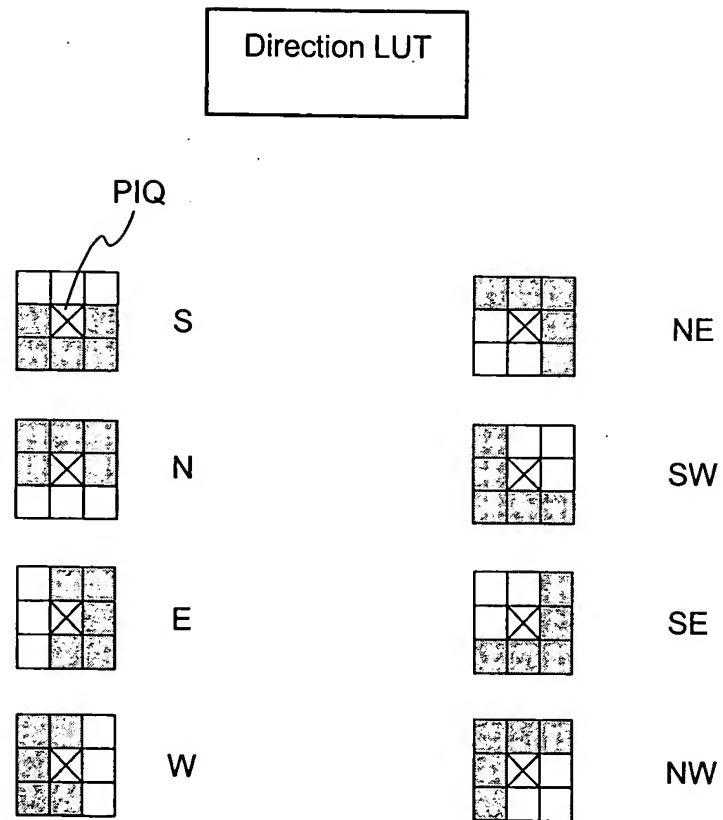
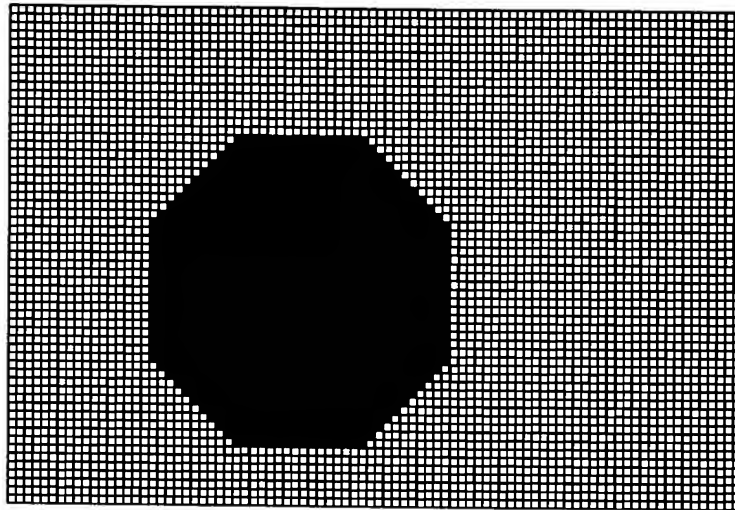


FIG. 3



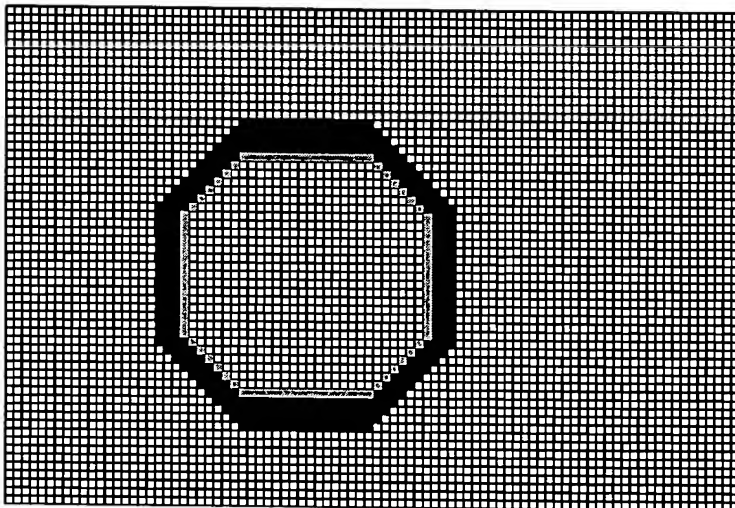
All other combinations result in zero.

FIG. 4



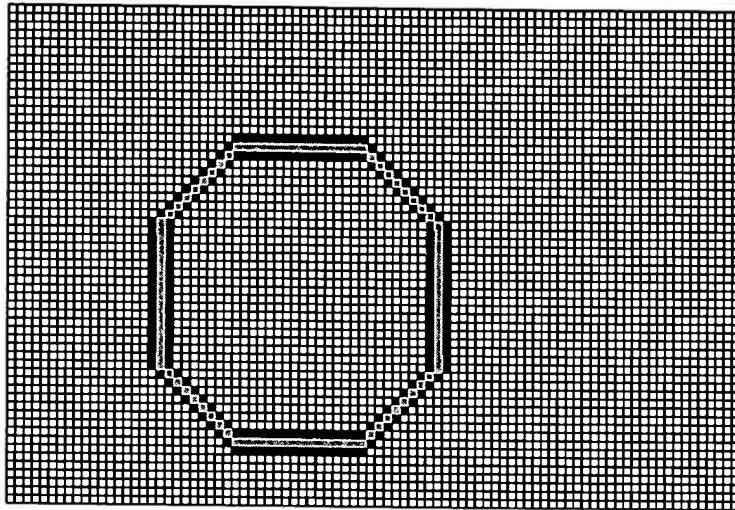
Original object  
bitmap

FIG. 5a



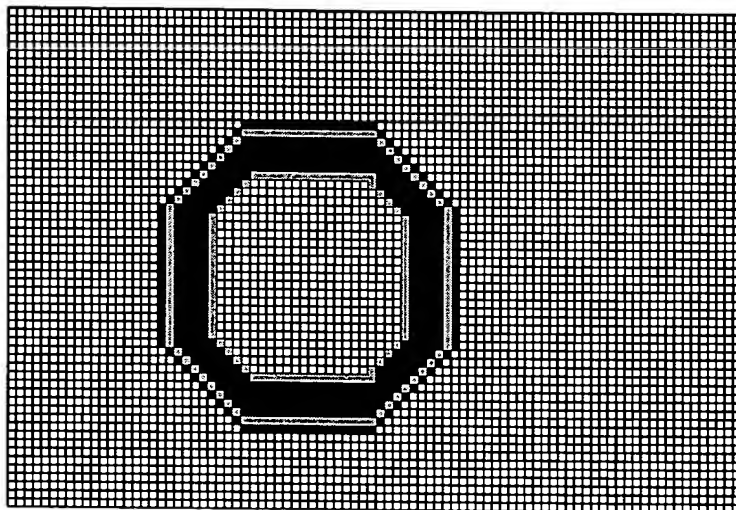
Four onion skin  
layers when thinning

FIG. 5b



Three onion  
skin layers when  
thickening

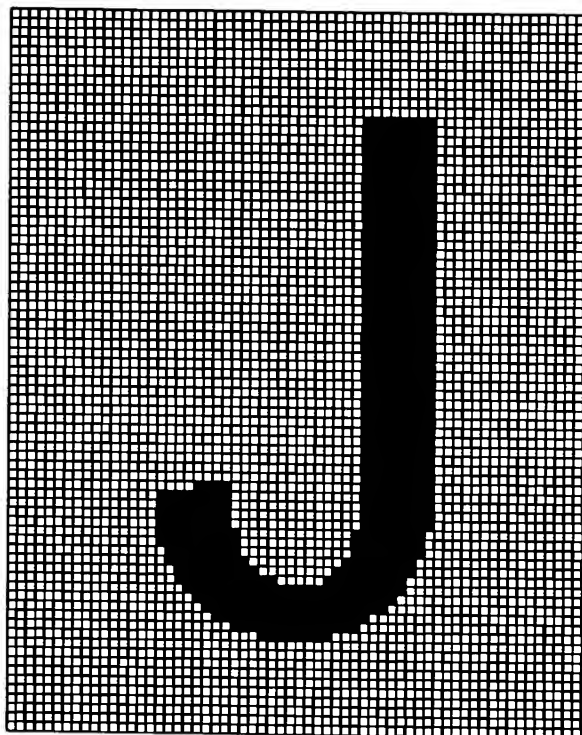
FIG. 5c



All layers  
(thickening and  
thinning)

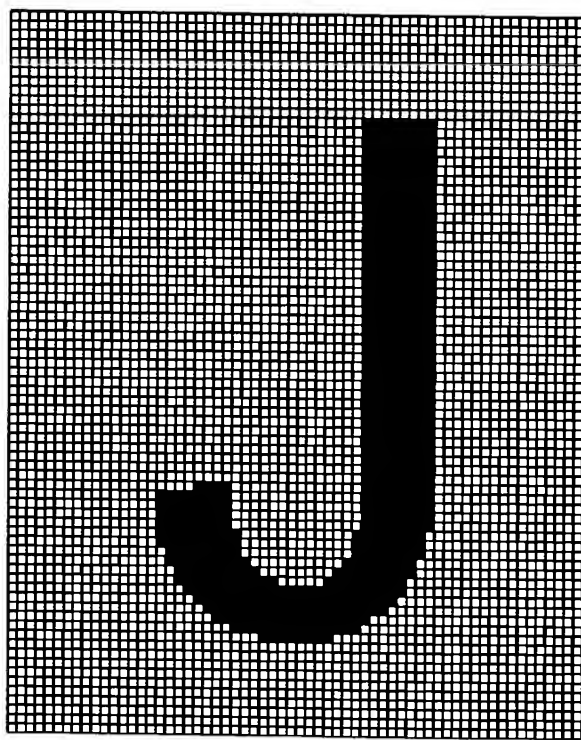
FIG. 5d





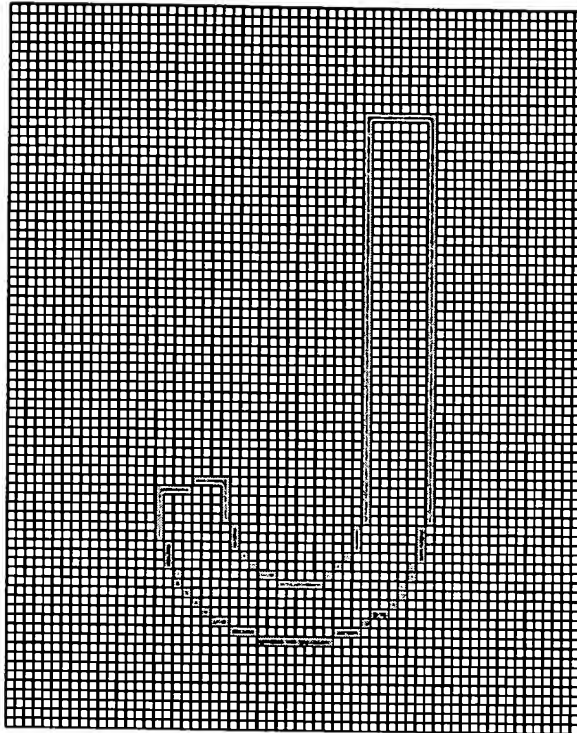
Original  
Binary Bitmap

FIG. 6a



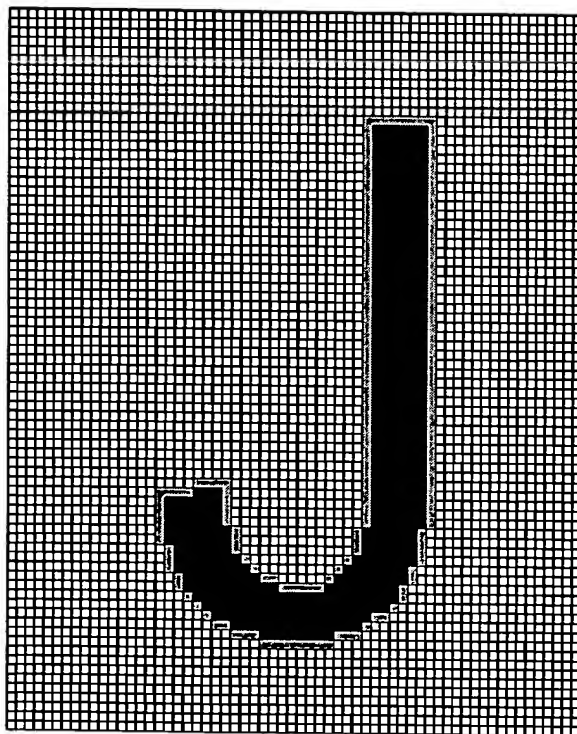
Same grey level pixel value  
value assigned to edges  
and solid area density

FIG. 6b



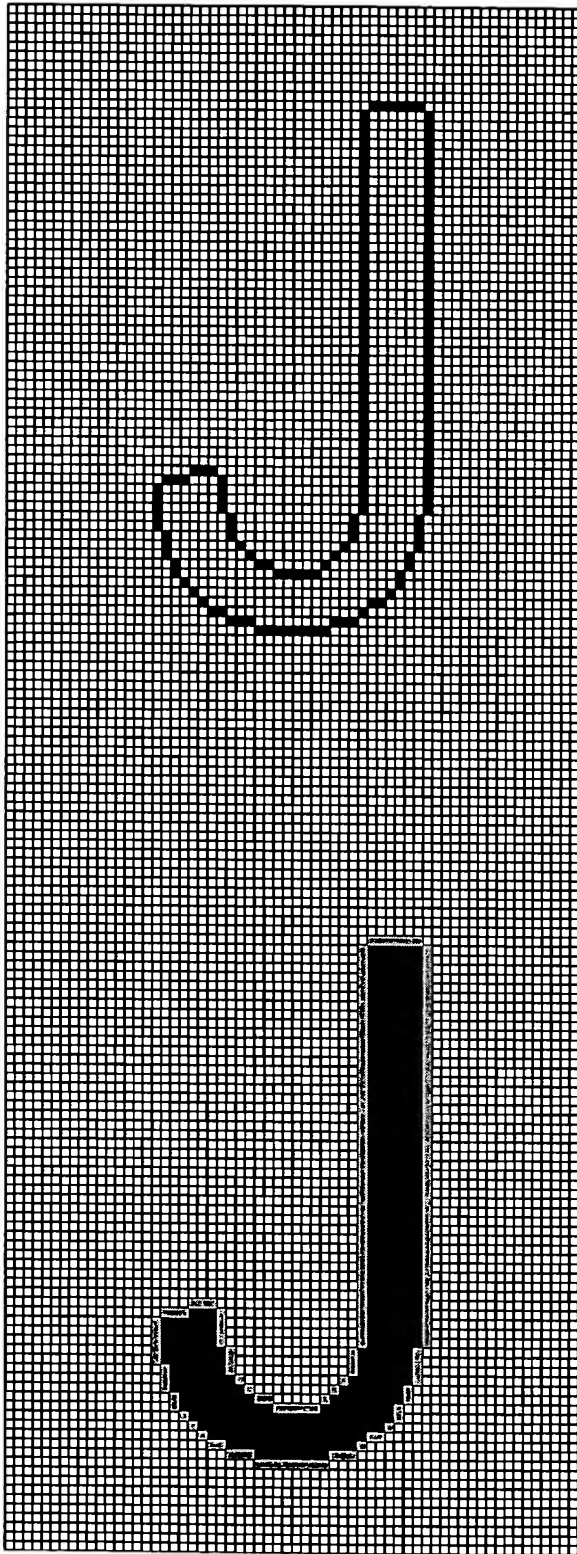
Edges  
when thinning

FIG. 6c



Lightened-  
Solid area density reduced  
Letter thinner

FIG. 6d



Edges  
when thickening

FIG. 6e

Thickened  
Letter thickened by applying  
gray to edges which were  
originally white

FIG. 6f



## 2 Pixel Wide Detection

Original 2 pixel wide line

FIG. 8a

## Edge Pixels

FIG. 8b

### Direction Values

FIG. 8c

## Assignment

FIG. 8d

BP: Background Pixel

EP: Edge Pixel

**2W: Two Pixel Wide Line**

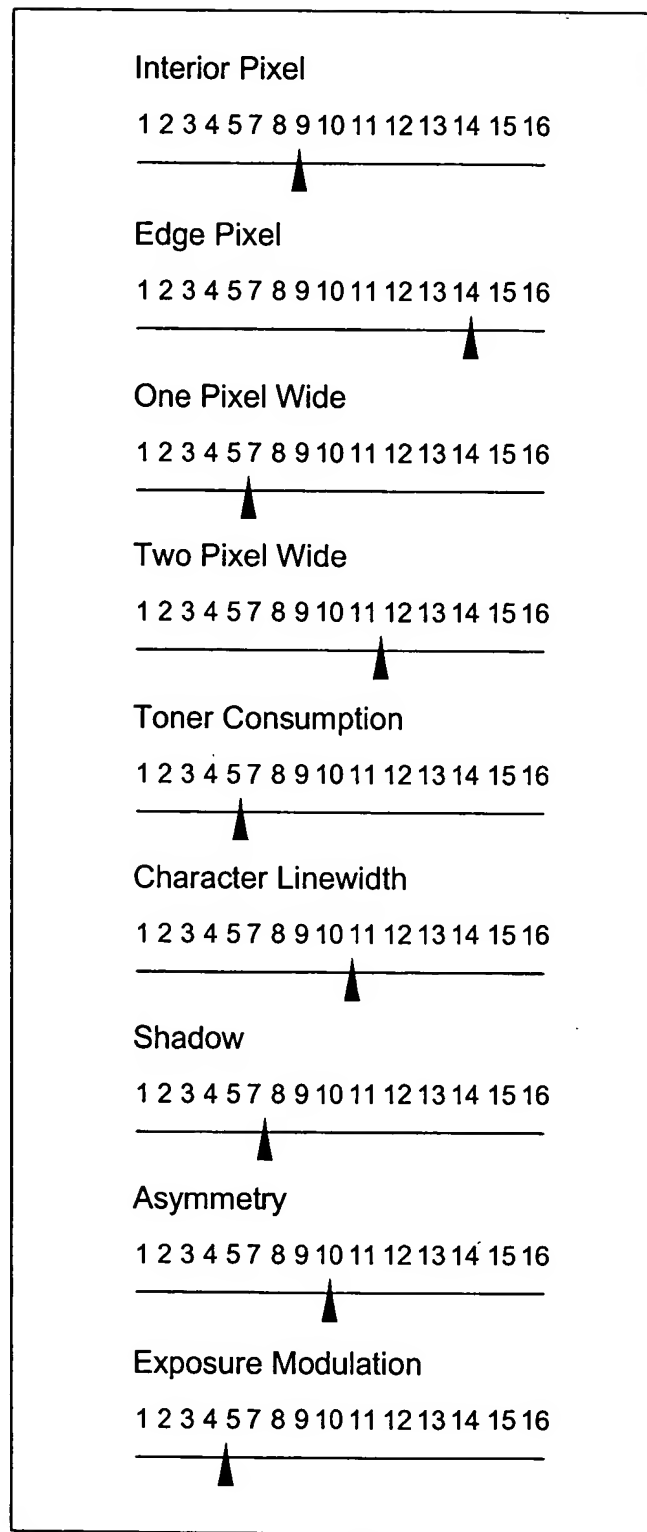


FIG. 9

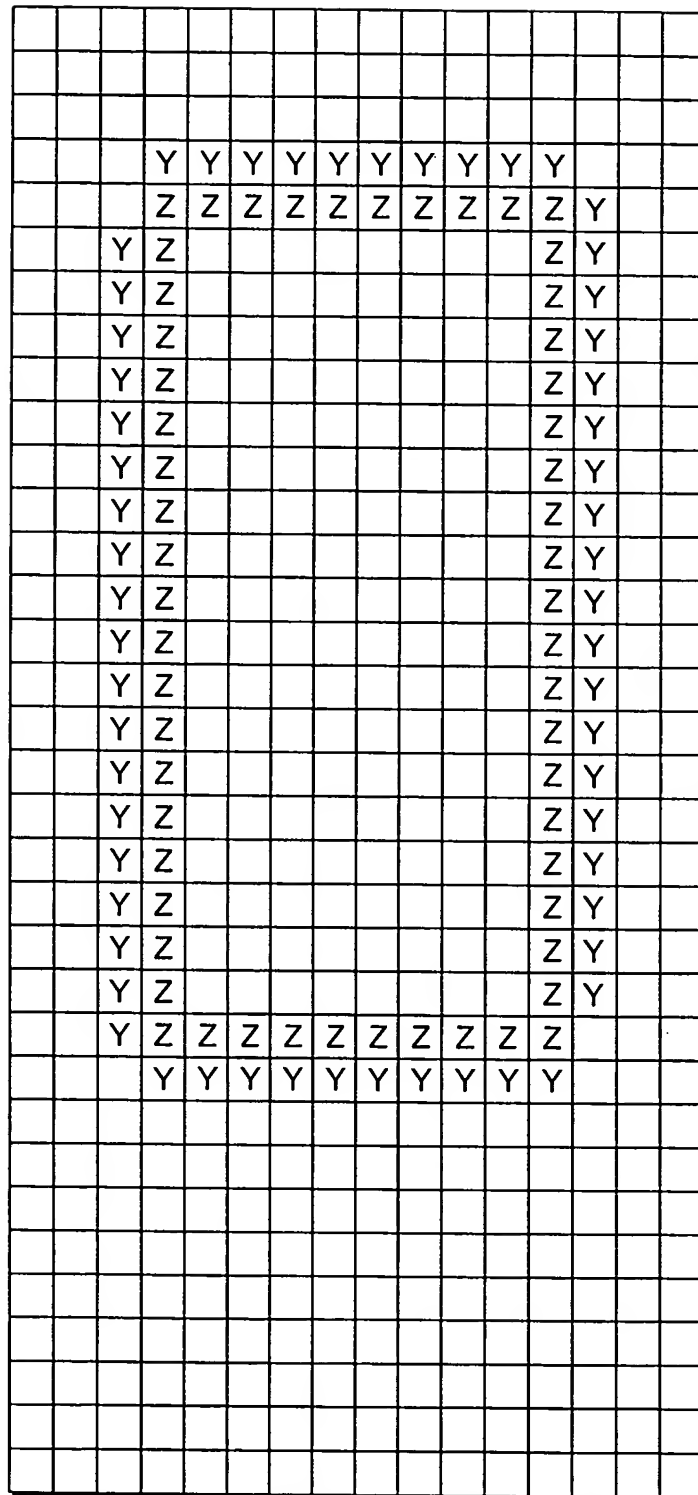


FIG. 10

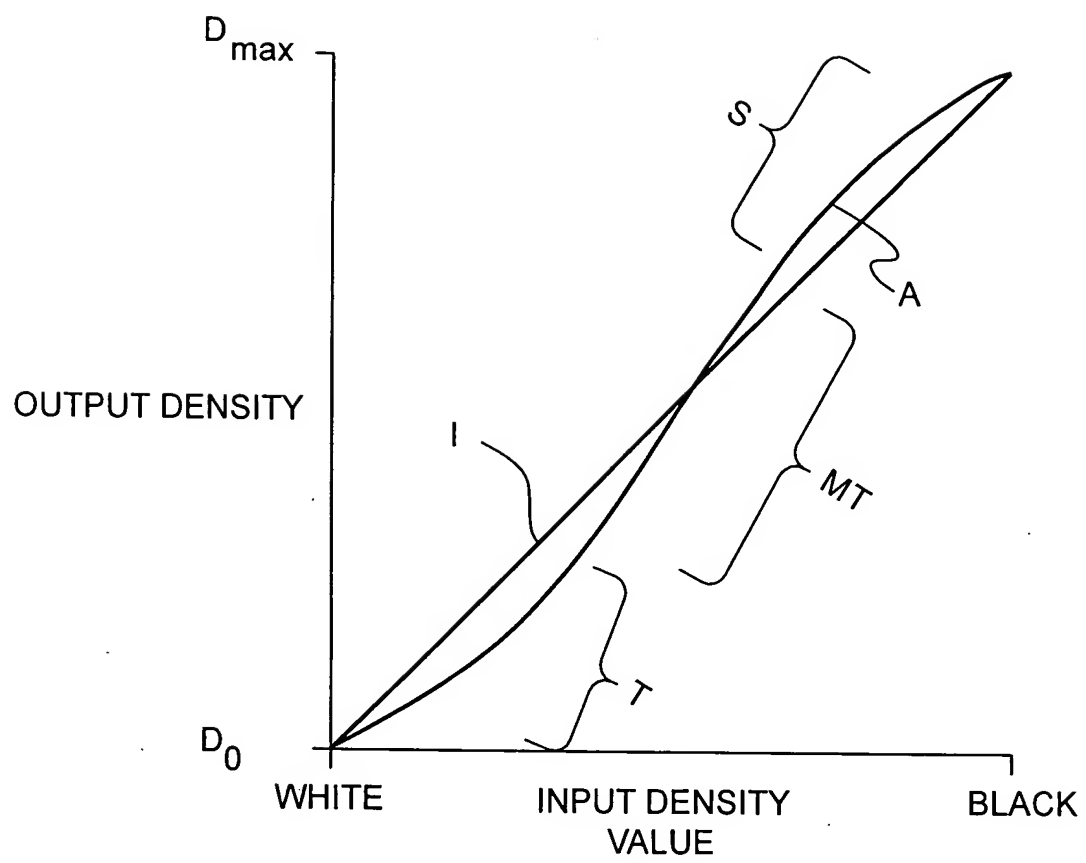


FIG. 11



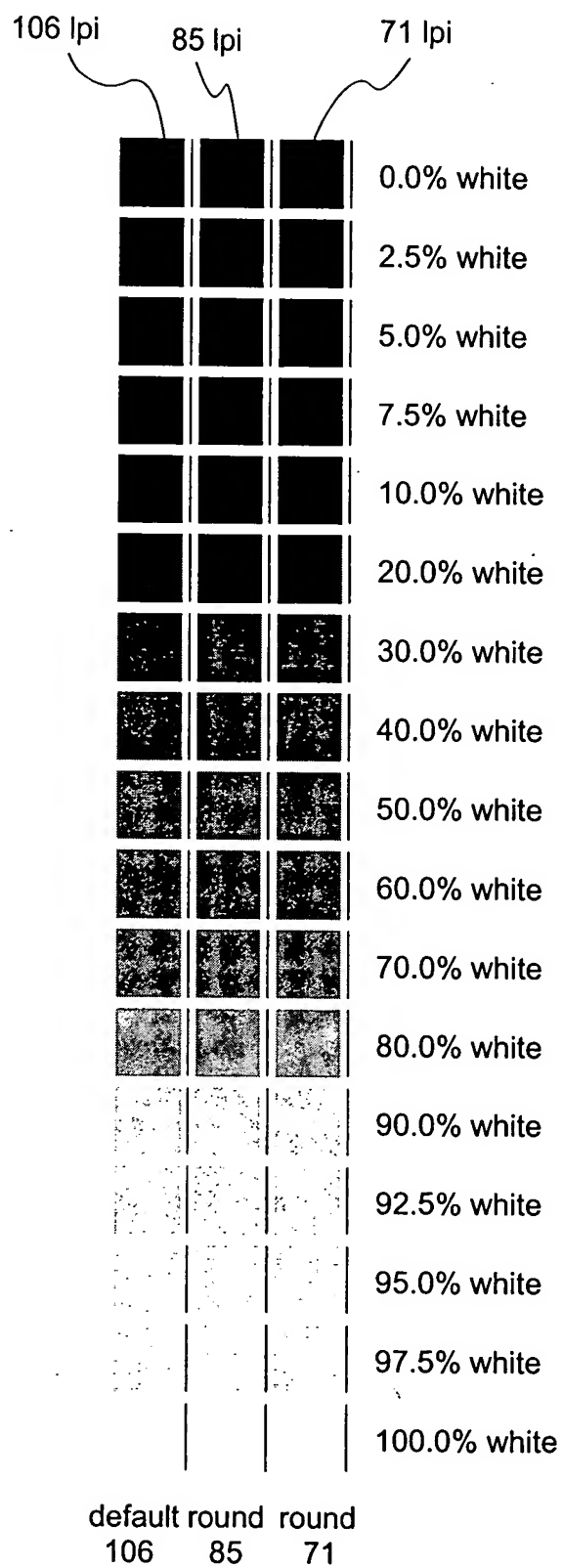


FIG. 12

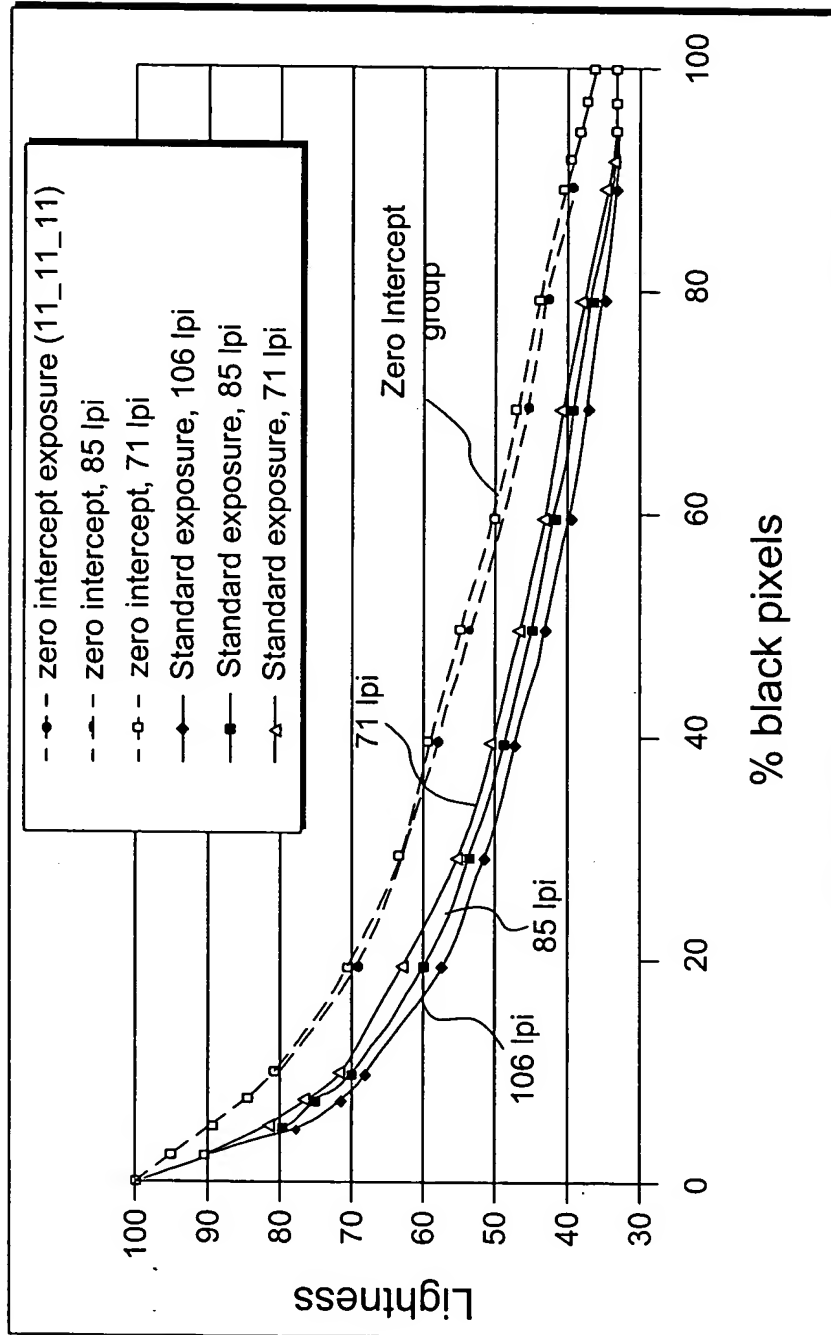


FIG. 13

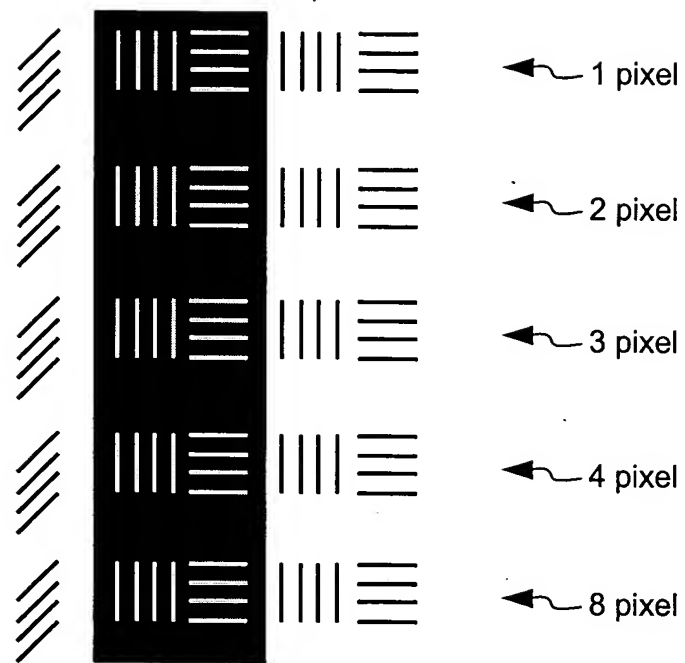


FIG. 14

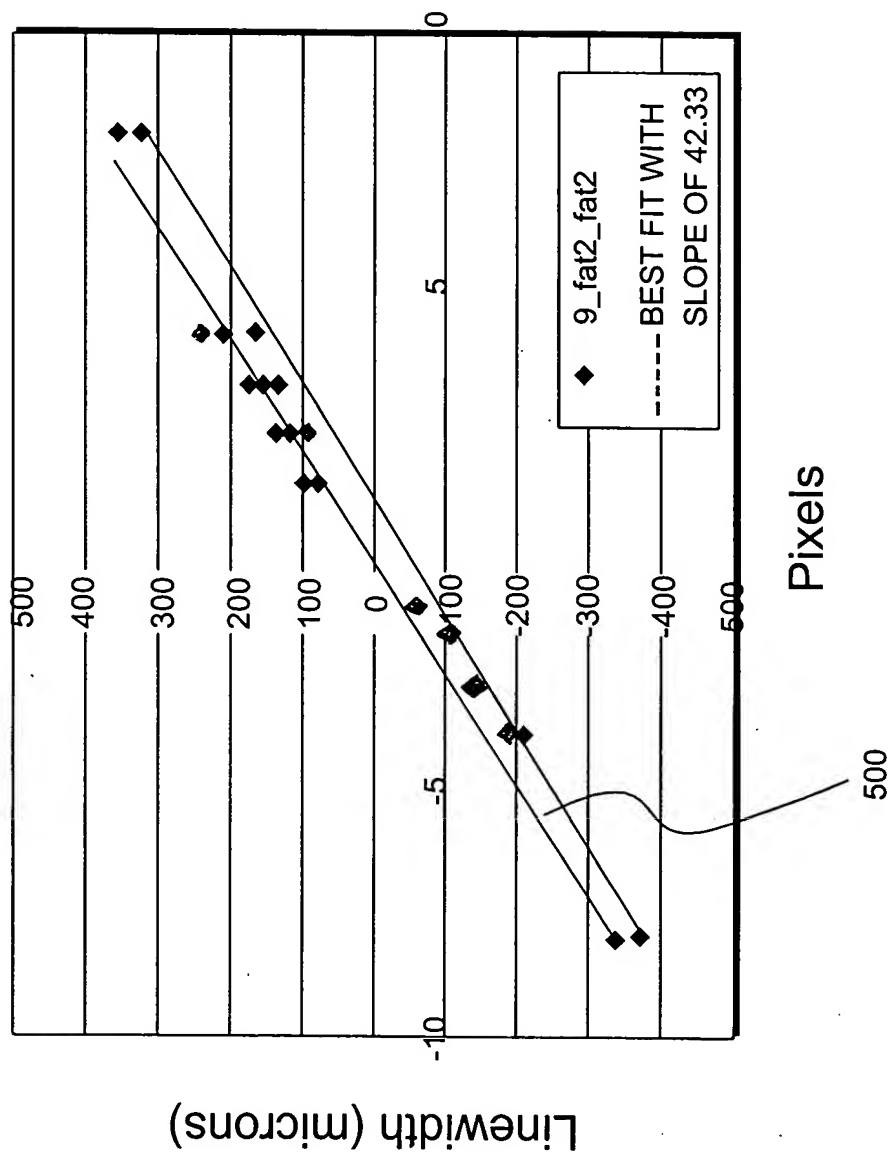


FIG. 15

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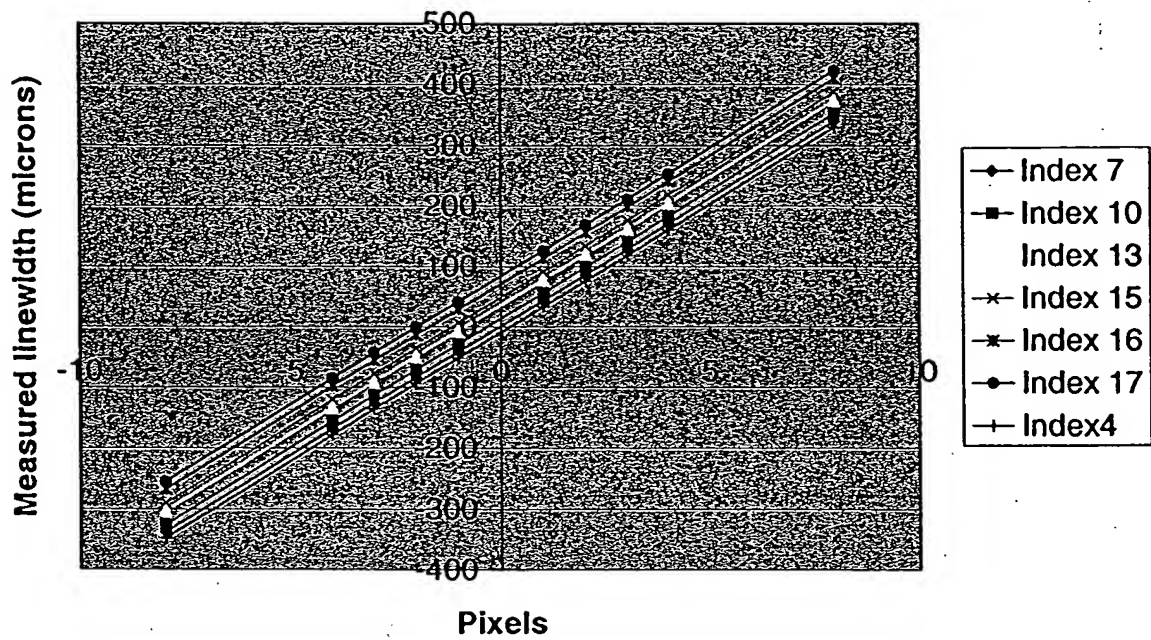


Fig. 16

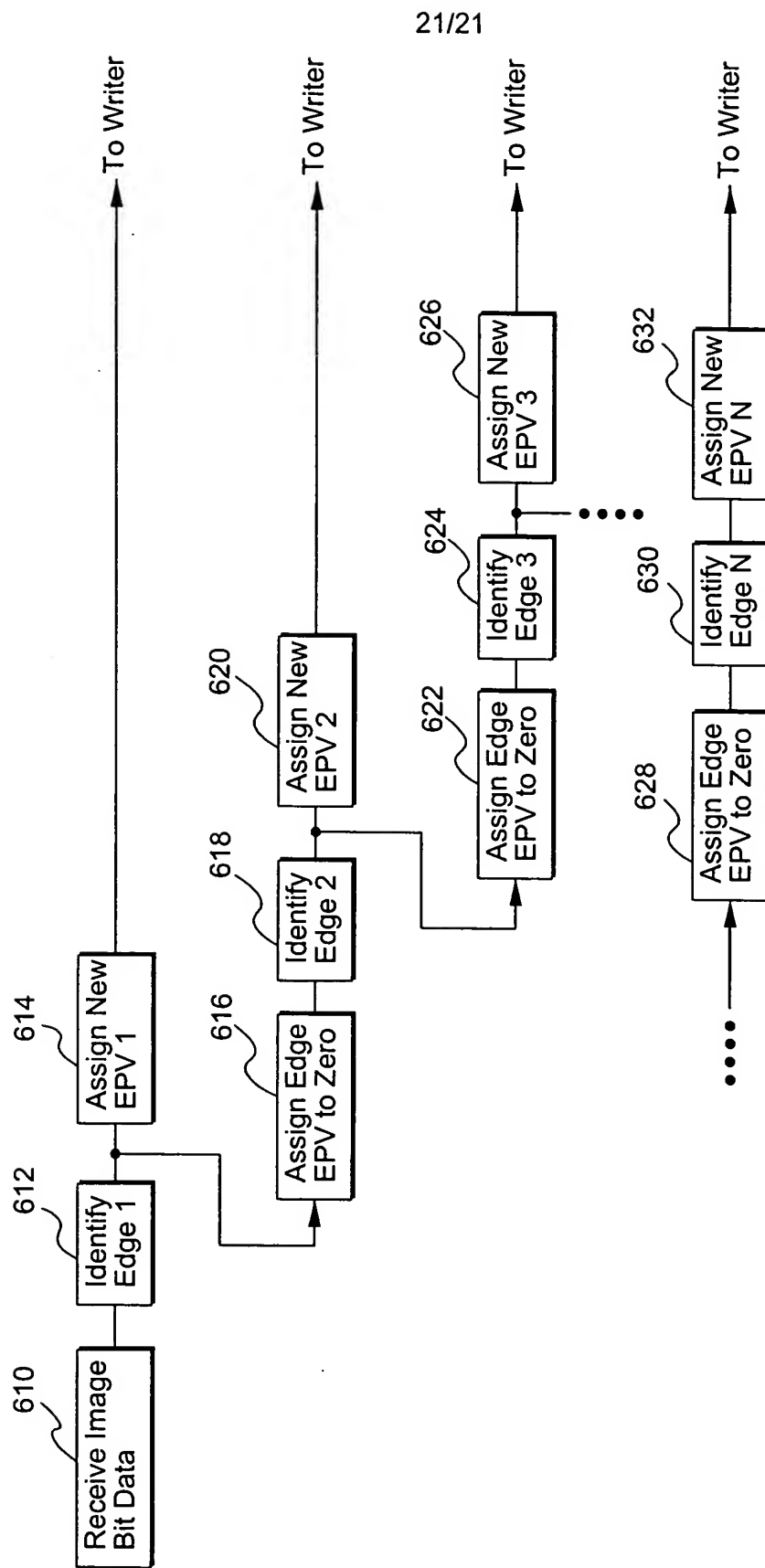


FIG. 17